Remarks

Applicants respectfully request that the Examiner reconsider the present application in light of the following remarks. No claims have been amended, added or cancelled. Therefore, claims 1 and 3-14 remain pending in the present application.

Claims 1 and 3-14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art (AAPA) in view of U.S. Patent No. 5,878,496 to Liu et al. ("the Liu reference"). Applicants respectfully traverse this rejection.

Claim 1 is directed to a process for forming a metal cylindrical bearing roller consisting of the steps of: 1) obtaining a hardened metal cylindrical blank having end face surfaces, a lateral surface defining an outer diameter, and a centered circular bore, the bore having an inner surface defining an inner diameter; 2) honing the inner surface of the bore having a specified inner diameter, thereby forming an inner bearing surface; and 3) hard turning the lateral surface of the blank to a specified outer diameter, thereby forming an outer bearing surface concentric with the inner bearing surface. Further, the hard turning of the lateral surface of the blank further includes forming a radial crown, and the end face surfaces are unmachined thereby forming a metal cylindrical bearing roller.

By performing the method of the present invention, numerous advantages are realized. For instance, eliminating the need to machine the end faces of the bearing allows the bearing roller to be manufactured in fewer steps and is less capital intensive. *See Specification*, pg. 10, lines 3-5.

None of the references of record teach or suggest a process consisting of forming a metal cylindrical bearing roller wherein the end face surfaces are unmachined as recited in claim 1. The Examiner relied upon the Liu reference to reject claim 1. *See Office Action*, pgs. 2-6 (May 28, 2004) ("Office Action"). The Liu reference is directed to a process that involves identifying the in-service stresses that limit the service life of a component, such as a bearing race (10), and inducing an appropriate level of residual stresses within the component to offset the in-service stresses to substantially optimize the component's service life. *See* Col. 1, lines 6-12; Col. 2, lines 21-26. In order to induce the appropriate levels of residual stresses within the component, the Liu references states that the surface of the component is machined. *See* Col. 5, lines 12-46.

In rejecting claim 1, the Examiner stated that one having ordinary skill in the art at the time the invention was made would have realized that only the inner and outer bearing surfaces of the bearing race disclosed in the Liu reference would be subject to in-service stresses, not the end face surfaces. *See Office Action*, pgs. 3-4. Based on the assumption that the inner and outer bearing surfaces of the bearing race are the only surfaces subject to in-service stresses, the Examiner concluded that the Liu reference only suggests machining the inner and outer bearing surfaces to induce residual stresses therein to offset the in-service stresses. *See Office Action*, pg. 4. In other words, the Examiner has taken the position that the end face surfaces of the bearing race in the Liu reference are not subject to in-service stresses, and as a result, would not need to be machined to induce any residual stresses therein.

Applicants submit that the Examiner's assumption that the end face surfaces in the Liu reference are not subject to in-service stresses, and therefore are not machined, is inaccurate based upon the enclosed Declaration under 37 C.F.R. § 1.132 by William D. Bauman. As stated in Paragraph 3 of the Declaration, Mr. Bauman is a joint inventor in the above-identified patent application.

As stated in Paragraph 4 of the Declaration, Mr. Bauman reviewed the Office Action dated May 28, 2004 in which it was stated that the Liu reference is directed toward selectively machining a pre-hardened component by "identifying those in-service stresses that limit service life of the component and then inducing an appropriate level of residual stress within the component [by such selective machining] in order to off-set the in-service stresses and thereby substantially optimize the component's service life" and that "[o]ne having ordinary skill in the art at the time the invention was made would have realizes (sic) that in a bearing race, such as the one disclosed by Liu et al, that the stress levels are generally normal to the inner (or outer) bearing surface rather than the end faces" *Office Action*, pg. 3, last paragraph.

In Paragraph 5 of the Declaration, Mr. Bauman states that while many of the in-service stresses induced on a roller bearing are generally normal to the inner and outer bearing surfaces, the end faces of a roller bearing are not free from in-service stresses. Mr. Bauman goes on in Paragraph 5 to state that because of side-loads that are typically placed on the bearings, in operation, substantial in-service stresses are placed on the end faces.

In Paragraph 6 of the Declaration, Mr. Bauman provides an example stating that, in a pushrod lifter, significant in-service side loading of the lifter roller bearing end faces occurs because the rotational clearances between the lifter and its receiving bore and the tolerance stack-up between features of the lifter and the receiving bore do not keep the rotational axis of the bearing in line with the associated rotating cam shaft lobe. Thus, in Paragraph 6 Mr. Bauman states that substantial in-service stresses are placed on the end faces. In Paragraph 7 of the Declaration, Mr. Bauman states that similar in-service side loading of the end faces of a roller bearing used in other applications would occur for these same reasons.

Since the end faces in the Liu reference would be identified as having in-service stresses that limit service life to one skilled in the art at the time the invention was made, the Liu reference does not teach that the end faces would be unmachined by the disclosed process. *See Declaration*, ¶ 9. In fact, according to the teachings of the Liu reference, if in-service stresses are identified on the end face surfaces of the bearing, then the end face surfaces would be machined to induce a residual stress to offset the in-service stress. *See* Col. 2, lines 21-26.

In Paragraph 8 of the Declaration, Mr. Bauman states that the present invention is directed toward a process of manufacturing roller bearings wherein the step of machining the end faces is eliminated. Stress relief of the non-machined end faces as well as the inner and outer bearing is accomplished by a subsequent tumbling process.

As such, the Liu reference fails to teach a process consisting of forming a metal cylindrical bearing roller wherein the end face surfaces are unmachined,

therefore Applicants request that the rejection of claim 1 be withdrawn. As claims 3-14 depend either directly or indirectly from claim 1, Applicants request that the rejection of these claims also be withdrawn for at least the same reasons set forth with respect to claim 1.

Conclusion

In light of the foregoing, Applicants submit that claims 1 and 3-14 are in condition for allowance and such allowance is respectfully requested. Should the Examiner feel that any unresolved issues remain in this case, the undersigned may be contacted at the telephone number listed below to arrange for an issue resolving conference.

Applicants do not believe that any fee is due at this time, however, the Commissioner is hereby authorized to charge any fees that may have been overlooked that may be due, to Deposit Account No. 10-0223.

Respectfully submitted,

Dated: 8/30/04

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